

Software and Information Engineering, Visualization, and Exploration



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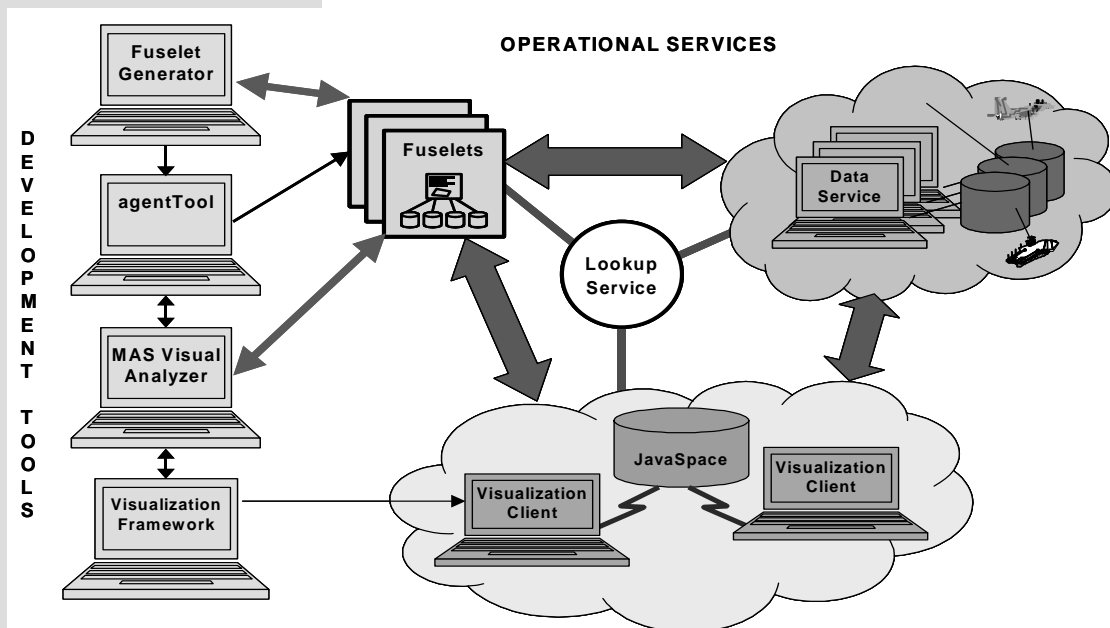
PhD, University of Utah, 1998

- Software engineering
- Software visualization
- Computer-aided engineering
- Information visualization
- Computer graphics

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Today's decision makers are faced with an extraordinary amount of information gathered from numerous sensors, models, and intelligence sources that are distributed across multiple interconnected networks. This information must be integrated, de-conflicted, organized, and presented to multiple individuals collaborating on immediate and long-range plans. A mix of powerful information processing applications, high-speed networks, and human analysis is essential for making intelligent decisions based on this information.

To develop applications meeting the information management needs of today's decision makers, AFIT has defined a conceptual architecture for accessing, integrating, and presenting tailored information from a variety of distributed data sources. AFIT has brought together researchers in software engineering, database systems, information visualization, and artificial intelligence to investigate methodologies and techniques for implementing this architecture.



One focus of our research is the application of visualization techniques to the analysis, design, evaluation, and customization of distributed software systems. Visual languages and diagrams facilitate analysis and specification of software systems and data ontologies from which applications can be semi-automatically generated. Application frameworks increase standardization and reuse to improve developer efficiency. Innovative software visualization techniques and intelligent software agents assist in the evaluation of software systems by minimizing the cognitive load on developers. Domain specific languages, coupled with visualization components and intelligent assistants, enable end-users to quickly configure applications with tailored information presented according to individual user needs.

Research is also focused on integration techniques for an extensive family of heterogeneous mission-level, weapon system models. This information must be made available to the decision maker in a format that can be tailored and presented according to individual needs. Interoperability and reuse of the underlying data files are significant challenges in this effort. This research combines object-oriented data modeling and information retrieval techniques with data interchange languages and agent-oriented analysis and design.



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